

HISTORIC AMERICAN ENGINEERING RECORD  
SEE MASTER PROJECT RECORD FOR CAPTION

Merchants Cold Storage Warehouse  
160 Kinsley Avenue  
Providence  
Providence County  
Rhode Island

RI-12

HAER  
RI,  
4-PROV,  
171-

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HAER  
RI,  
4-PROV,  
171

HISTORIC AMERICAN ENGINEERING RECORD

MERCHANTS COLD STORAGE WAREHOUSE

RI-12

Location: Providence, Rhode Island  
UTM: 19.300760.4634460  
Quad: Providence

Date of Construction: 1893-1910

Present Owner: Merchants Cold Storage & Warehouse Co.

Significance: The cold storage warehouse was one of the first of its type in Providence, R. I. It originally utilized the latest technology in insulation, generation of electricity and refrigeration, and still functions as a cold storage warehouse. It retains a rare and exceptionally well-preserved example of a Corliss steam engine.

Historian: Timothy King

It is understood that access to this material rests on the condition that should any of it be used in any form or by any means, the author of such material and the Historic American Engineering Record of the Heritage Conservation and Recreation Service at all times be given proper credit.

The cold storage business was introduced to Providence, Rhode Island by I. B. Mason & Sons, processors of and dealers in pork products. Shortly after 1890 the company was providing about 50,000 cubic feet of refrigerated, public storage space, which rapidly proved insufficient to accommodate increasing consumer demand. In response, I. B. Mason and several other local financiers organized the Merchants' Freezing and Cold Storage Company in 1893;\* I. B. Mason was named President. Before the end of the year a 90,000 square-foot tract of land fronting on Kinsley Avenue had been purchased and construction begun on a larger, more modern cold storage warehouse.

Located in the middle of Providence's produce district, the warehouse was primarily used for the storage of eggs, butter, cheese, apples and assorted dry fruits. The original warehouse contained 300,000 cubic feet of refrigerated space when it opened for business June 1, 1894. In 1896 it was enlarged to 1,150,000 cubic feet, and by 1910 Merchants' was expanded to 3,000,000 cubic feet of storage space - becoming the largest cold storage plant in New England outside of Boston.

The original structure was designed by the architectural firm of Stone, Carpenter & Willson of Providence, who incorporated brick exterior walls with recessed Gothic arches, corbeled belt courses, and drip moldings on a grand scale. Prior to construction, 3,000 piles were sunk and capped with concrete. Upon this base the foundation was laid, consisting of block granite walls and piers. The 1896 addition was designed by George Leach, the construction supervisor on the original section.

To minimize the cost of refrigeration, efficient insulation of the plant was a prime factor in the design of the building. The main storage area is six stories tall with a basement and is carried on substantial wood beams and posts, a framing system which remains intact. This form of "slow burning construction" was designed to carry a load of 400 lbs./in.<sup>2</sup> and was chosen over iron to minimize heat absorption through conduction. For this reason the few pieces of iron construction material used in the original section were entirely removed in the design of the 1896 addition. The floor plan was arranged with corridors separating the cold storage space from the exterior walls, thereby slowing the transfer of heat. The methods employed to directly insulate the walls, floors, and piping systems, however, were the major factors affecting the plant's cooling efficiency. Mineral wool was primarily used, and was filled into the spaces of the walls and floors in loose form rather than packed.

\*Renamed The Merchants Cold Storage & Warehouse Company, c. 1910.

Granulated cork was utilized where moisture might occur, e.g. around piping and brine tanks. Insulating paper provided a tight seal for the air cells that were built onto areas where additional insulation was required.<sup>2</sup>

The refrigeration, power and pumping machinery was located adjacent to the storage area in the smaller section of the building, which consists of three stories and a basement and was constructed almost entirely of brick and iron. Refrigeration was maintained through a system of brine circulation involving the use of three brine tanks; three ice machines, or compressors, driven by steam engines; an extensive network of circulating pipes; and an assortment of pumps, boilers, and auxiliary equipment. One of two original, engine-compressors sets still remains but is no longer used. The Linde compressors, built in 1893 by the Fred W. Wolf Company of Chicago, ran at 60 r.p.m. and were rated at 75 tons refrigeration capacity each, with 15-inch cylinder and 25-inch stroke. (1A) These compressors were each driven by a direct connected H. A. Harris Corliss steam engine, built in 1890. (1A, 1B) The engines were each run at 40-65 r.p.m. and had an 18-inch cylinder and 42-inch stroke, with a 14-foot flywheel weighing 18,000 pounds. (3C)

In 1910 a larger steam engine-compressor set was installed, which survived until recently when it was removed for scrap. (1C, 3A) The Wolf-Linde Double Acting Compressor #19A was 16-1/2" x 30" and had a 100-ton capacity. (1D) The engine which drove it was a girder-type Corliss built by the William A. Harris Steam Engine Company of Providence, Rhode Island. It had a low pressure cylinder, 32" diameter x 42" stroke, and its flywheel was also 14 feet in diameter weighing approximately 16,600 pounds. (2C, 2D, 3B) The engine was designed to serve as a secondary engine. Its operation was dependent upon exhaust pressure from one of the two original H. A. Harris engines and was run almost continuously. Only occasionally was it necessary to operate all three engines simultaneously.<sup>3</sup>

In the original refrigeration process the ice machines compressed ammonia gas into liquid used to extract heat from the brine. The cooled brine would then be pumped through the coils of the various coolers, maintaining temperatures as low as -4°F. in the freezers. After World War II, the company converted all of its cooling units to freezers to meet the demand for frozen foods. At this time one of the original H. A. Harris engines was removed to provide space for new equipment. They continued to employ brine circulation, however, until recently when quick-freezing equipment was installed.

Today, three 30,000-gallon brine tanks remain in situ,<sup>4</sup> and the original hydraulic elevators continue in limited use. Although only one of the three original engine-compressor sets remains, it is being preserved in excellent condition in the engine room. The Merchants' warehouse, with its own active rail spur, currently stored meat, poultry, and cranberries.

FOOTNOTES

<sup>1</sup>Gary Kulik and Julia C. Bonham, Rhode Island: An Inventory of Historic Engineering and Industrial Sites, Historic American Engineering Record, Heritage Conservation and Recreation Service, Publication #5, U. S. Department of the Interior, 1978.

<sup>2</sup>"Cold Storage in Providence", Ice & Refrigeration Illustrated, (H. S. Rich & Co.: Chicago & New York) Vol. XII, No. 2, February 1897, pp. 89-90.

<sup>3</sup>Based on a phone interview with Merchants Cold Storage employee, Arnold T. Hampson, August 6, 1979.

<sup>4</sup>S. Robert Chiappinelli, "Old Engine Moves Over Into History", Providence Bulletin, May 22, 1979.